THE CHEMIST

AUGUST 1949 VOLUME XXVI No. 8

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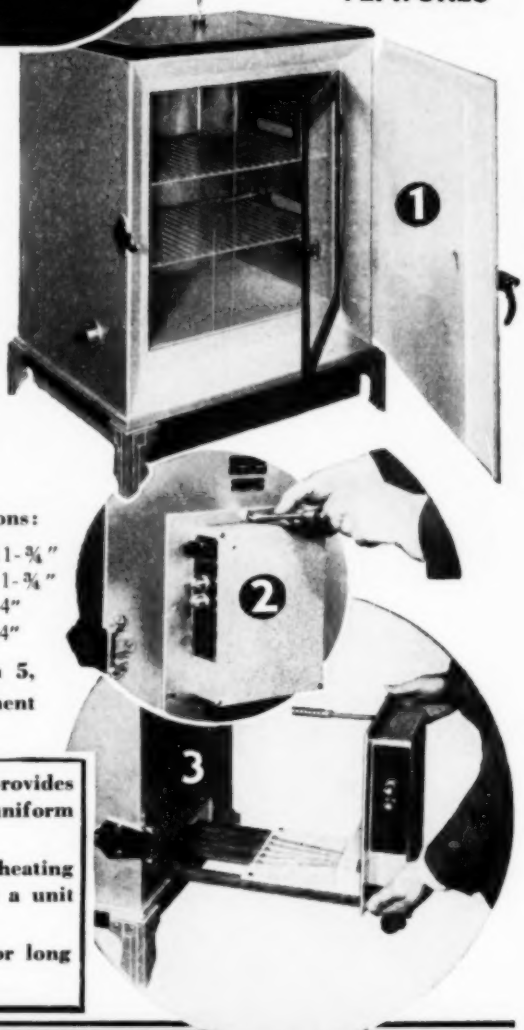

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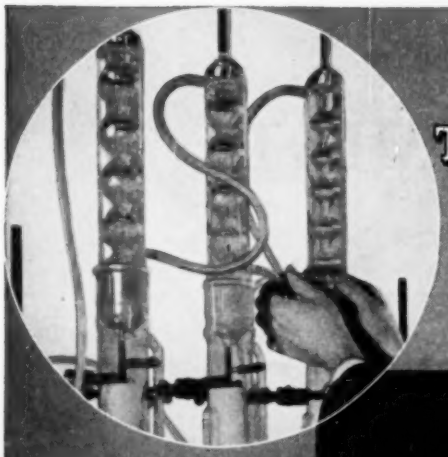

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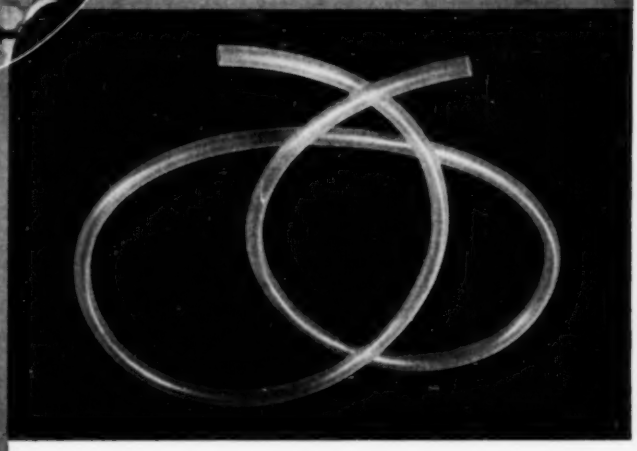

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SCHEDULED FOR EARLY ISSUES

Governmental Impingements Upon Industrial Research (Annual Meeting Paper), by John W. Anderson.
The Role of Universities and Industry-Financed Research (Annual Meeting Paper), by Dean Ovid W. Eshbach.
The Chemists' Economic Status (Annual Meeting Paper), by Dr. Louis Koenig, F.A.I.C.
Manpower and Industry, by H. B. De Vinny.
How Can A Chemist Increase His Value? by C. P. Neidig, F.A.I.C.
Best Foot Forward, by Luella Canterbury
How Good an Employer Is Your Company? by Howard Nechamkin, M.A.I.C.
Industry Looks to Education, by Dr. Frank M. Surface.
Toxic Materials in Industry, by Dr. Laurence T. Fairhall, F.A.I.C.
Award of Honorary Membership to Dr. E. R . Weidlein
A Challenge to Medical Research, Dr. Herman J. Schneiderwirth, F.A.I.C.
Other Material.

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COVER PICTURE

Dr. Hilton Ira Jones, F.A.I.C., managing director, Hizone Laboratories, 1211 Washington Street, Wilmette, Illinois, received the Award of Merit Certificate at the Eleventh Annual Editorial Competition held recently by *Industrial Marketing* of Chicago. He was honored for his column, "Peeps at Things to Come," which he conducts monthly in *The Rotarian Magazine,* published by Rotary International. The certificate was given for "an outstanding series of articles among Class, Institutional, and Professional Papers."

Dr. Jones obtained the B.A. degree from Parker College; the M.A. degree from Drake University; the Ph.D. degree from the University of South Dakota, and the honorary degree of D.Sc. from Dakota Wesleyan University. After several years of teaching, during which he headed the departments of chemistry of Dakota Wesleyan University and Oklahoma A. & M. College, he directed scientific research for the Redpath Bureau and for National Selected Morticians. He established his own business, Hizone Laboratories, in 1922. He holds numerous patents. For thirty years he has lectured and written on chemical subjects.

Dr. Jones is the second member of the Advisory Board of THE CHEMIST to be honored by *Industrial Marketing* this year. (For the other member, see Cover Picture, July issue of THE CHEMIST.

EDITORIAL

Thoughts for Chemists Seeking Employment

Harold A. Levey, F.A.I.C.

Councilor from Louisiana Chapter

(One of a series of editorials being prepared by members of the Council of THE AMERICAN INSTITUTE OF CHEMISTS.)

THE writer's office has been a clearing house, during the last several decades, for chemists seeking employment. It periodically happens that some woman connected with an employment bureau telephones to our laboratory to inquire if we have an opening for a chemist, and if not, can we suggest where the operator might seek employment for a chemist who has registered to secure employment through that bureau. Invariably, I advise the inquirer that if she will send the chemist to my office, I will lend every effort to secure the re-employment of that chemist. This is done so that I may have an opportunity to talk with that chemist.

While such a chemist has doubtlessly applied to the bureau as a last resort, or in desperation, it is not believed that the chemist realizes that such a procedure not only de-professionalizes him, but removes his possibility of securing employment in a position with any significant status. It is indeed rare that industries endeavor to secure chemists for top-flight positions through general employment bureaus. If chemists do succeed in securing employment through this channel, it is usually in mediocre positions in the form of laboratory aides or for routine laboratory analyses. In order to evaluate his status when seeking re-employment through this channel, it only becomes necessary for the chemist to place himself in the position of the personnel director of the firm who is trying to secure the services of a chemist. Such a personnel director promptly recognizes that the chemist seeking employment through this channel unquestionably lacks the initiative to approach, personally, directly, and independently, the position that he desires. To use a slang expression, he definitely needs a nurse. As a result, the applicant is initially at a definite disadvantage in applying for the position. If the chemist recognizes himself as a professional practitioner, he must immediately appreciate that other professionals, such as the attorney or the physician, never resort to general employment bureaus to assist them in locating connections. It is for these reasons, that

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the chemist lowers himself in the minds of his prospective employers, the employment bureau, and anyone else to whom he may have disclosed his tactics.

In addition, it must be further recognized that the employment bureaus which specialize in the re-employment of tradesmen, unskilled and skilled, are not familiar with the employment of professional people. Few of these, if any, understand the ethical approach that befits a chemist with an adequate amount of self-respect to approach an employer for a position of importance. The only sources of information which might lead to the employment of the bureaus' chemist-applicants would be classified directories, professional engineering offices, advertising through the papers, or direct mail solicitation in an anonymous form. All of these procedures can be conducted in a more ethical and acceptable form directly by the chemist himself, which will redound in the end to his credit, in a more befitting fashion.

In the interest of the professional status of the chemist which each of us will have to preach to our co-professionals, as well as to educate the public up to this matter of thinking, I invariably, in the interview, endeavor to impress upon the chemist what it means to him individually to conduct himself in a professional manner by avoiding the tactics described above.

V.P.I. Inauguration

Dr. J. W. Watson, F.A.I.C., head, Department of Chemistry, Virginia Polytechnic Institute, was the official delegate from THE AMERICAN INSTITUTE OF CHEMISTS at the inauguration of Dr. Walter Stephenson Newman as tenth president of the Virginia Polytechnic Institute, Blacksburg, Virginia, April 18th. Delegates present represented about two hundred and fifty colleges, learned and professional societies, educational associations, public officials, and alumni officers.

The inaugural ceremonies were held at eleven a.m., with William E. Wine, rector of the V.P.I. Board of Visitors, presiding. The delegates and guests were officially welcomed by Dr. John R. Hutcheson, chancellor of V.P.I. The principal address was given by Dr. James R. Killian, Jr., president, Massachusetts Institute of Technology, on "The Importance of Being Useful." In the inaugural address, President Newman discussed proficiency in the professions, better research, adult education, military at V.P.I., continued close relationship with the public schools.

Governor William M. Tuck brought "on behalf of the Commonwealth of Virginia greetings and heartiest congratulations to Virginia Polytechnic Institute and to President Newman."

The delegates, official guests and their wives were entertained at luncheon at the Faculty Center. A military parade by the V.P.I. Corps of Cadets concluded the program.

Work Joins Consulting Firm

Dr. Lincoln T. Work, F.A.I.C., formerly director of research and development of Metal and Thermit Corporation, is now associated with Alan R. Lukens at Powdered Material Research Laboratories, 11 Windsor Street, Cambridge, 39, Mass., consultants. Dr. Work will widen the field of the consulting firm to undertake work on abrasives, refractories, metal powders, cements, and dusts.

Prior to joining the Metal and Thermit Corporation nine years ago, Dr. Work was a member of the staff of the Chemical Enginering Department of Columbia University. Many will recognize him for his chairmanship of ASTM's Technical Committee III on particle size, and for his chairmanship of ACS symposia on grinding and fine particles in 1945 and on fluidization in 1948. He is a councilor-at-large of THE AMERICAN INSTITUTE OF CHEMISTS.

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The Extension of Chemistry into Non-Chemical Industries

Earl P. Stevenson, *President*, and Raymond Stevens, F.A.I.C., *Vice President.*

Arthur D. Little, Inc., Cambridge 42, Massachusetts.

(Presented at the Annual Meeting A.I.C., Chicago, Illinois, May 7, 1949.)

A CHEMIST is tempted to call most industries chemical, knowing as he does that chemistry plays a significant part at some stage in their operations. Even to the layman, many industries are now classified as chemical that once would have seemed remote from chemistry. The Chemical Fund, an investment trust devoted exclusively to chemical investments, has published a list defining chemical industry. Its present portfolio includes --in addition to industries that are obviously purely chemical or pharmaceutical—the glass, rubber, and petroleum industries, and several companies such as Eastman and Minnesota Mining which once were predominantly physical or mechanical companies. The Chemical Fund's publications state that: "in addition to companies producing chemical raw materials, or manufacturing chemical products, the Fund considers that the chemical field includes all companies in whose operations the advancing technology and science of chemistry may be expected to play an increasingly important role. Thus a wide range of companies producing such important products as drugs, explosives, fertilizers, glass, metal alloys, paints, paper, petroleum products, photographic materials, plastics, rayon, rubber and vegetable oils and soaps, and manufacturers of many other products to whom the use of chemicals or chemical processes is of importance are all considered in the chemical field."

Some industries in that list, paper for example, would once not have been termed chemical. The transition to a chemical industry has been due to initiative and enthusiasm, almost zeal, on the part of chemists and chemical engineers. In some industries the transition has proceeded so rapidly that for the time being an industry originally mechanical or physical is listed as chemical; in others, as in housing, the impact of chemistry has altered its character to a lesser but nevertheless significant degree. In the building industry, for example, the postwar demand for inexpensive housing has emphasized the chemical nature of wood and wood products.

The plywood industry, which is one of the largest producers of building materials was born twenty-five

years ago and has grown as much during the last three years as it did in the first twenty; 1,125 outlets have been listed in which plywood is now being used. The chemistry of adhesives has expanded from application of animal glues, through casein glues to synthetic resins, and has assisted toward the development of a water resistant glue, which would permit outside construction with plywood. Molded plywood or products of laminated veneer shapes has become possible by the application of specialized adhesives. Canoes and rowboats of plywood have participated in championship racing and large timbers needed for ship-building have been produced by the impregnation and the lamination of wood with synthetic materials from the chemical industry.

Long-wearing floor materials are no longer dependent upon the linseed-oil crop, for linoleum manufacturers have found a new raw material in synthetic resins. Largely of the vinyl type, these resins allow self-sealing floors (and the same property allows molding up along the baseboard to relieve the housewife of dirt-catching corners) and wider color range in decoration, combined with longer wear. Enamelled steel resistant to a variety of atmospheric conditions are further products of a directed study of inherent properties of materials which may be brought out by special treatment or new combinations. Snug interiors have been achieved by application of special forms of glass, chiefly glass fiber, as thermal insulation. Double window panes conserve heat, special ceiling materials to absorb sound are available for new construction, including mats of glass fiber of gossamer fineness. Within the short span of its industrial life (fifteen years) the glass fiber industry has progressed with the aid of chemistry from the production of coarse fibers to tonnage production of fibers only fractions of microns in diameter. New glasses have been formulated to meet chemical stability problems posed when a glass marble weighing one-third of an ounce and having a surface less than two square inches is extruded into a filament having a diameter of .00028 inch, sixty-two miles long, and having a surface of twenty-two and a half square feet. Ordinary glass so subdivided would quickly dissolve in water or disintegrate on atmospheric exposure. Fine glass fibers are used in new textile fabrics, and furnish a remarkable structural material when combined with plastics, offer an improved means of sound absorption and are useful in the cleaning of atmospheric air for industrial purposes. Fine glass fiber is, in other words, a most versatile material.

The Electrical Industry

"Chemical engineers are rapidly becoming an important asset to the electrical manufacturing industries

through interpretation and application of their technology to production problems." These are the words of N. R. Maleady of General Electric. The properties of insulating materials, protective coatings, the evaluation of new materials: these are all problems for the chemist in the electrical industry. As for the future: the "growth of chemical engineering in the electrical manufacturing industries has been a gradual and healthy one. Changes cannot be expected overnight, but the future assures a prominent place for the chemical engineer in the electrical manufacturing industry."

Fluorescent Lighting

In a natural science museum the exhibit dearest to the hearts of small boys is the fluorescent minerals display. When they press the button, dull rocks glow in luminous greens, rich reds, in blues and deep purples under the influence of "black light," turning an untidy pile of rocks into an Aladdin's cave. The knowledge that certain minerals emitted visible light under the influence of black light made possible the development of fluorescent lighting. The naturally occurring minerals which exhibited these phenomena, however, were not sufficiently reliable to be used for fluorescent lighting as we know it everywhere today. The chemists therefore set about the synthesis of tungstates, silicates, and sulfides, and discovered that certain processes of purification and subdivision were necessary to obtain commercially satisfactory pigments. The phenomena of fluorescence were studied, and it was learned that the introduction of certain foreign elements in precisely controlled quantities into the crystal structure was necessary in order to evoke visible light under the influence of ultra-violet light.

The materials now commonly used are magnesium tungstate and zinc beryllium silicate, although recently a large number of other mineral compositions have been discovered that do not have the disadvantages of unstable zinc sulfide and some other active but physically less suitable compounds. The discoveries made in the fluorescent lighting field were the result of intimate study of the endless combinations of chemical elements —the chemist's job—plus the knowledge of means of energy control that the physicist has contributed. To industry, the discovery has meant the pushing of one company up to second place in lamp production, first place in fixture production, and its entry into the pigment field. Sales of fluorescent lamps as a whole went from $500,000 in 1938 to $54 million in 1946, although tubes cost in 1946 less than half of what they had cost in 1938. The tailor-made, or better said, custom-chemist-made, materials made available to the industry have meant more rapid development of television communication, and the be-

ginning of color television. The careful control for pigments of unusual purity, the incorporation of minute amounts of impurity, the adjustment of particle size to performance necessary in the development of fluorescent lighting are all trade-marks of scientific method, and yet the story of the utilization of phosphors for illuminating lamps is one of which the past has written but a first chapter.

Crystal Research

Crystal research is one of the "fashionable" as well as important branches of science at the moment. Its development is a brilliant illustration of the strengthening of the bridge between chemistry and physics. Crystal research will strike into many fields in the future, but one or two of its present applications are worth mentioning. Crystals are used in rectifiers; silver chloride, thallium, or bismuth iodides are used for the transmission of infrared radiation. Tungstate crystals are used for showing nuclear radiations. The properties of zinc crystals are highly important to the transmission of both radio and electric impulses. One company has produced perfect star sapphires as well as the very rare tourmaline (more lustrous than the diamond) by growing crystals with a controlled minute amount of impurities.

The Transistor, a competitor for electronic tubes which was recently announced by Bell Telephone Laboratories, could in principle ultimately replace a large share of the $90 million worth of tubes sold each year. The development of the Transistor was based on the discovery that a minute piece of germanium, a semiconductor like silicon and some other materials, could be used in the construction of the tube. It is another example of the chemist lending aid to the physicist. Germanium had been considered a rare metal until a process for its recovery was recently developed by a lead-company chemist, making it available in reasonable quantities.

A new word has been added to the ever-growing American vocabulary of popular science—this time, the $64 word: cybernetics—and crystal research is concerned with it. Machines have been taking over more and more of man's muscle work but up to now his mental processes were mercifully man's own. It is however no longer inconceivable that machines of the future will be labelled not only in terms of their "h.p.'s"—horsepower, representing their sheer Percheron strength, but also in terms of their "b.p.'s" — brainpower, representing the extent of their delicate and facile ability to reproduce men's mental processes—and E. M. Forster's "Machine" begins to loom ominously before us!

To develop an electronic calculator which could duplicate the number of circuits of the human brain would

still require a skyscraper to house it. Memory alone would take up enormous space. A column of mercury now promises a compact and faster way to duplicate memory-in-motion. "The mercury tube is the kind of 'brain' in which information is supposed to go in one ear and out the other. An electrical signal . . . causes a quartz crystal to expand by the well-known piezoelectric effect. The crystal brushes against the mercury and a ripple runs through faster than the eye could follow." The search is on now for crystals possessing certain characteristics not found in naturally occurring minerals such as quartz, and the search lies within the province of chemistry, to whose workers it offers a challenging problem.

The Automobile Industry

The mechanical engineer and the designer have called upon chemistry many times to give the reliable performance and beauty of today's automobile. Cracking, iso-octane and tetra-ethyl lead play their role in the motor of 7 to 1 compression ratio, bring the promise of the 12 to 1 high-compression engine in another year. Special adhesives from synthetic polymeric materials increase the power and life of brakes by increasing the braking area (no rivets) by 15 per cent and holding the lining to the drum more tenaciously and uniformly for 30 per cent longer wear. A careful coordination of the properties of surfaces, methods of application of adhesives, times and temperatures of polymerization, as well as the training of operators, are methods brought straight from the chemical industry to the automobile plant. A dash of polonium in sparkplug wires contributes a saving, while the car motor idles in heavy traffic, by being a better conductor at the right temperature. Moth-proofed wool, Nylon, vinyl plastic sheets and fibers for the beautifully colored, longwearing upholstery have progressed from the field of chemical investigation to items of industrial demand, returning to the several producing industries a sizable figure in sales dollars from the forty million vehicles now on the road.

It is stated that the automatic transmissions of new cars will need 1,400,000 gallons of fluids in 1949, and these fluids are largely petroleum fractions with viscosity improvers, antioxidants, and other chemicals. With the advent of synthetic lubricating oils it can be expected that the chemists will contribute more than additives to adapt petroleum fractions to the increasing demands of the hydraulic fluids. The organic chemist is even now at work on tailormaking a molecule for this exacting service. In like vein he threatens to introduce a universal coolant for the internal combustion engine, both gasoline and diesel.

It has been stated recently that although estimates have varied concern-

ing the sources of air pollution, a figure commonly quoted is: 60 per cent caused by industry and railroads, and 15 per cent by commercial buildings. Industry turns to chemistry for help in managing its contribution to national health by cleaning up the air.

An investigation of the reaction of smogs and fumes to methods of precipitation, the disposal of fly ash by gathering it either chemically or mechanically, the installation of dust suppressors where needed, the utilization of germicidal vapors, and the investigation of methods of using fuel in stoves and heaters can quite naturally be expected to involve chemical principles and chemical methods.

Various communities, especially where industry has become concentrated, are stimulating the correction of pollution by appropriating funds for the investigation of hygienic conditions. Cleveland made available $103,000 for this type of work in 1949, a budget ten times larger than that set up in 1939 for the same purpose. Chicago has a budget for 1949 of nearly $200,000. Several states have regulatory laws concerning both air and water pollution up for enactment. A national water pollution act became law last summer.

Several new industries have grown out of the chemical utilization of just these waste products of industry. The production of yeast and alcohol from waste sulfite liquor, formerly dumped into streams or ocean, is among the more recent chemical contributions toward drawing value of waste. Most of the vanilla now used in this country is fortified with a product derived from waste sulfite liquor, and yeast high in proteins for animal feeding was recently reported in production. New evaluation of sulfite liquor has been the result of a cooperative effort of paper manufacturers who organized a Sulfite Pulp Manufacturers Committee on Waste Disposal and supervised the setting up and development through pilot plants of the specific study.

Paper

If the paper industry is to give each United States citizen the 343 pounds of paper per year he now demands, mostly to write on or to take goods home from the store in, the paper manufacturer needs more than the mulberry tree or old clothes. By 1860 he realized that he would need a more abundant raw material than rags, and if wood would do, a method of obtaining its desirable fibers would have to be evolved. After a period when mechanically ground wood, first from poplar, then fir spruce, temporarily filled the gap, the industry called in the chemist. It is significant that the new pulp material was promptly termed "chemical pulp." The early days of sulfite pulping, highly important to the paper industry, have in some sixty years proven to be of value as well to many established industries and have undoubtedly contributed to

the creation of new ones. The "paper and pulp" industry now produces ten main classes of paper, five large classes of paper board, and yeast, tall oil, alcohol, vanillin, and lignin. It supports an active Institute of Paper Chemistry. Chemistry has been the future of the paper industry: production has more than doubled since 1930. The methods of chemistry brought sulfite, then sulfate, and the marked advances of the past few years; but the adaptability of chemical methods to allied fields of production instigated as well refinements in instrumentation, better bark removal, reforestation, and improvements in machinery of all types.

Synthetic Fibers

The English cellulose chemist, Charles F. Gross, told paper-makers in 1899 that the "actual operations involved in the paper-making processes are not those which are visible in the mass, but the invisible, to be followed only by the scientific imaginations, aided by those instruments and observations which belong to the science of physics and chemistry." He and his associate Bevan made contributions not only to the paper industry, but to the textile industry. During a study of alkali mercerization in 1892, they discovered the process of xanthation of cellulose, or the viscose process. Related work elsewhere with cellulose led in turn to a process for cellulose acetate and the way was paved for the host of other synthetic fibers now following this discovery.

A du Pont spokesman recently said: "knowledge of linear polymers has now reached a stage of development which makes it easy to synthesize a new fiber-forming polymer," and du Pont has done just that with the new Orlon fiber, which is based on a new set of raw materials. This is the most wool-like fiber of the synthetics, and will probably be used in industrial fabrics, since it is highly resistant to weathering and to sunlight. Of comparatively tender age, and in some measure in direct competition with Orlon are the new synthetic fibers based upon vinyl plastics, the Vinyons. With raw materials produced by a large chemical manufacturer, and with the textile manipulation in the hands of one of the largest of the rayon producers, Vinyon N ties more closely the bond between chemical engineering and the textile industry.

Attempts to produce a fiber to compete with wool led to the utilization of proteins as raw material for "synthetic wool," and just before the war, casein fibers appeared. The small amount of casein fiber produced went directly into textile uses for admixture with rayon or wool, or for insulating fabrics. Today, casein fiber is about to go into commercial production for air filters for automobiles. Recently production of a synthetic fiber from a constituent of corn, the protein, zein, began, and is of-

fered to the trade as "Viyira." Du Pont is preparing production of a new Fiber V, the nature of which has not been disclosed, but which is said to be superior to Nylon or Orlon. New government patents disclose protein fibers from cottonseed meal; in England a factory is being built for the production of textile fibers from protein meal, and experimental work is under way for the use of soybean meal for fiber which may be utilized in textile fabrics. Most recent of all, is the production of paint brush bristles from reconstituted chicken feathers!

Petroleum

The "Chemical" petroleum industry is of recent vintage. In the early days, crude oil was pumped from the ground and separated into several commercial products by simple boiling, and the whole process was about as chemical as Vermont's maple syrup business. The incessant meddling of the chemist with "earth oil"—meddling which went from simple straining through distilling to thermal and catalytic cracking, alkylating, reforming, super-fractionating, hydrogenating, dehydrogenating and polymerizing, and all their variants, has established fortyfour leading refining processes, the operation in 1947 of 369 refineries handling daily nearly six million barrels of crude oil, and an investment in plant and assets by the eighteen largest refining companies of more than ten billion dollars, with a technical staff increased from 5,000 in 1941 to 15,000 in 1946-7.

The application of heat and pressure to promote chemical reaction in the desired direction in a complex raw material brought, as Warren K. Lewis pointed out several years ago, a happy day for the petroleum industry. Crude distillation used only eighteen to twenty-five per cent of the petroleum for fuel for internal combustion engines, and those internal combustion engines were not eight cylinder jobs. Thermal cracking raised the recovery to forty per cent, and the gasoline to seventy octane. Catalytic cracking further raised the recovery of gasoline from crude oil to more than fifty per cent, and the gasoline to eighty octane or more. The first hundred-gallon lot of iso-octane was made in the laboratories of Arthur D. Little, Inc. in 1927, at a cost of $25 per gallon. The high cost was, however, less important than the fact that iso-octane could be produced, and when the demand came for aviation gasoline, the refiner could supply it.

Now, through the agency of chemists and chemical engineers, the petroleum industry is second only to the purely chemical industries in the support of research, its top management includes research men, and its contributions to the general advance of science pure and applied, are outstanding in quantity and calibre.

It is not to be expected that the communications or the electrical or other physical and mechanical industries will become predominantly chemical as has petroleum, or give chemistry the emphasis found in paper manufacturing, yet even the electrical industry is following the party pattern. Chemists working on materials important to it are advancing other industries as in plastics and branches of metallurgy, and are creating new businesses as in the relatively new industrial field of silicon chemistry. The building industry supports major research activity as in the great new laboratory of Johns-Manville. New products and quite conceivably whole new industries may result from this research, as did viscose and synthetic textiles from paper's cellulose studies.

Book publishing is in the process of radical change, with the chemist playing his part in improvements, including adhesive binders which replace stitching, faster inks which speed printing. Nowadays the shoe industry cements many soles instead of stitching them, and uses increasingly chemist-built materials. The metalworking industries find electropolishing replacing much tedious and expensive buffing, and they look forward to new metals and alloys being introduced. Even the blast furnace now finds its operation being changed as a result of a chemical approach to the reactions taking place when fourteen to fifteen hundred tons of molten iron are drawn from the ore daily in one furnace.

The chemist and his brother scientists, moreover, have carried into industry a philosophy that transcends their technology in importance. They have brought a habit of searching for fundamentals, of elimination of mysteries, of organized use of the experimental method. They have, as Dr. Little once phrased it, "The simplicity to wonder, the ability to question, the power to generalize, the capacity to apply" and "bring the power and fruits of knowledge to the multitude who are content to go through life without thinking and without questioning, who accept fire and the hatching of an egg, the attraction of a feather by a bit of amber, and the stars in their courses as a fish accepts the ocean." Alfred North Whitehead said the most important invention of the last century was the method of making inventions. The important contribution of chemistry to industry has been the philosophy and method of the chemist which do more than remake the technology of an industry. The influence of chemistry is felt in management policy, in the adaptability of a business to a changing world, often in the general tone of the personnel and in greater stability and prospect of growth of the industry.

Chemists within an organization constitute a liaison with the scien-

tific world. The New England Council, in grappling with the problem of research for the small industry, found that a small company could not support extensive, outside activity in science and technology any more than it could in advertising or in legal counsel or other professional services. The Council, after extensive study, recommended that small companies employ a technical graduate, not necessarily for direct research work—he might be a salesman or a production manager—but to serve as a link between his company and the many sources of technical assistance open to chemists and other scientists who know the world of science.

Ever newer opportunities for chemistry and the methods of chemical engineering appear. The chemist works today in close cooperation with his fellow scientists in the invention and perfection of new processes for industry. Dr. Karl Compton, in remarking on this cooperation, pointed particularly to the development of atomic research during the first part of the 20th century, saying: ". . . physicists had to learn more about chemistry, and chemists more physics. And the discoveries of each provided new tools for both." We might paraphrase Dr. Compton and say that industry has been learning more about chemistry, and chemists more about industry; and the discoveries of each are providing new materials and new tools for both.

The phraseology of the chemist, the physicist and the engineer has even come into colloquial use: one hears its echo in "blueprint for victory," "pilot stage," "test tube theory." Statesman Winston Churchill, in speaking at the recent M.I.T. Convocation, found it not at all difficult to sum up the promise and problems of our century in terms of science rather than politics. The food we eat, and the way we prepare it, the houses in which we live, and the way we live in them, are due in a surprising measure to chemistry. Even our national frame of mind has taken form in the fertile atmosphere of scientific philosophy: Americans in general are more optimistic than men of other nations because they have seen so much once considered improbable or impossible become fact through the efforts of scientists and business men. Americans recognize in themselves a shy devotion to fact and method, a wholehearted respect for persistence, for organization and discipline in work; and place a high value on education and specific training—but concomitant with them they applaud the daring idea, the sudden insight, which may open a new business or a new era. These attributes of the scientific mind have crept into our national character: one may claim indeed that chemistry in this way is moving into and far beyond non-chemical industries, even to our national and international life.

The Role of The American Institute of Chemists in Educating Chemists

Dr. Gustav Egloff, F.A.I.C.

Universal Oil Products Company, Chicago, Illinois

(Presented on the occasion of the award of Honorary A.I.C. Membership to Dr. Egloff, medalist, and twice-president of the A.I.C.)

THE chemists of our nation have done a magnificent job in making this world a better place in which to live. They have contributed material advancement to medicine, food supplies, clothing, housing, and many other fields. Their scientific achievements are without parallel. Through publications, the chemist has done much to educate the world to make possible even greater accomplishments. On the professional side, however, the chemist lags far behind. He has not contributed what he can and should to the broader sphere of human activity, nor has he imbued the younger members of the profession with a real professional attitude. His training should be such that he will be not only an able chemist but a citizen of stature.

THE AMERICAN INSTITUTE OF CHEMISTS is an organization dedicated solely to professional objectives. Its aims leave the INSTITUTE an unlimited field in which to work. Progress has been made but the time has arrived for more concrete action. The INSTITUTE serves chemists both old and young, but to be most effective, we must reach the future chemist in his formative years.

Inasmuch as no one is born with professional instincts, education along these lines must begin as soon as the student has chosen his profession. The INSTITUTE can help by providing vocational advice, assisting colleges and universities in formulating a program of sufficient breadth to prepare well-rounded citizens, and driving home to both student and teacher the necessity for professional pride.

The INSTITUTE should take an active part in vocational guidance work. It is of great importance that high school students be given sufficient counseling to make an intelligent choice between various college curricula. This kind of activity is of service not only to the student but to the profession. Chemistry graduates with only a half-hearted interest in the field are a detriment to the profession as a whole. The Chicago Chapter of the INSTITUTE is engag-

ing in vocational guidance work through its affiliation with the Chicago Technical Societies Council. This Council holds an annual career conference for high school students in which over fifty occupational fields are covered. A number of INSTITUTE members hold sessions on chemistry. The experience of the 1948 Conference was gratifying. Every INSTITUTE chapter should make an effort to promote similar conferences. Most students have little opportunity to become acquainted with any other than purely academic aspects of a given field which are only a part of the consideration in choosing a career.

After the student has chosen a field and is pursuing college studies, he needs guidance of a different type. In all professions there are a variety of positions. Not every chemist works in a research laboratory nor is every student with chemical interests suited for that kind of work. The INSTITUTE should establish a speakers' bureau to inform students, and in a number of cases their professors, on what the many opportunities are. The right kind of advice will not only facilitate the placement of the student but also help him in choosing auxiliary courses during college.

Encourage the Study of Language

The INSTITUTE should study the curricula offered in chemistry and chemical engineering and suggest changes therein which will assure graduates of a good background from the professional point of view. Too many schools concentrate their efforts on grounding the student in his major subject. While a thorough knowledge of chemistry is basic for every chemist, he needs a much broader background. Even though a chemist spends his entire life in a laboratory, he has to know the English language well enough to transmit results to other departments. Lack of education in English and public speaking is probably the greatest defect in scientific and engineering graduates. Everyone knows some scientists and engineers who can write and speak effectively, but one does not have to search long to find poor examples. In the writings of a Ph.D. chemist, the following gem is found:

> ". . . in any subsequent change, if such is made, he is better off and only slightly behind where he might have been if the second results had been obtained in the first instance."

That this pronouncement lacks clarity is an understatement.

Even more discouraging is the fact that some science and engineering graduates use bad grammar. One student, about to graduate from college wrote the following letter:

> "Dear————
>
> Knowing of how busy you are I'de like to thank you for answering my letter relating to————& its derivatives of which we are both interested in. I believe a little misunderstanding has crept up that needs clarifying. The blame was all mine for not makmy letter more clearer. I hadn't intended that you do my research work for me as my letter perhaps lead

you to believe. I know your much to busy & your company isn't paying you for doing my research work. I have already completed my bibliography having gone through Beilstein, Chemical Abstract & other books to see what compounds were made & published. My first letter was written to you before my bibliography was started & not knowing then of how——— reacted——— other compounds I thought were some pointers you could give me. As I stated my bibliography is completed & now I have a very good idea as to what groups have been put in———& how they were put there. Again let me thank you for your kind consideration in answering my letter. I remain

Sincerely,———

P.S. I would like very much to hear from you again as I'd be very much interested in working under you for the———Co. after I graduate a year from this coming June.

"Because of my interest in ——— & its derivatives along the background I can obtained in them while working on my thesis I can be a definit asset to your Company. Would you be so kind as to keep me me in mind for a position under you."

Inasmuch as this student will soon graduate, may one expect that his grammar will improve with age? With such individuals representing the profession, is it any wonder that chemistry is not considered a profession in some quarters?

Public speaking is also good training for the professional man. He will probably find it necessary to address groups of people. Even though these instances may not be frequent, he will find good self-expression a necessity in getting along from day to day. Public speaking develops poise which is an asset in dealing with other persons at any level. It inspires the self-confidence necessary to handle difficult situations. Many chemists have the unfortunate habit of muttering in their beards. At conferences where they are trying to tell management about their work, this practice results in antagonizing listeners and giving chemists a more pronounced inferiority complex than they had in the beginning.

Emphasize Human Relations

The education of the chemist should also include some courses in other fields so that he will be more aware of his relation to other segments of society. In this day and age, it is highly necessary to have science and engineering represented in the administration of business and government. In executive positions, the chemist must know human relations. If his education has been limited entirely to material concepts, his job will be difficult. It is gratifying to know that some colleges are pioneering in an effort to de-emphasize specialization in the undergraduate curriculum with post graduate work providing the additional training required. In some schools, a five-year course of study is required for the bachelor's degree. The importance of English, public speaking, psychology, philosophy, economics, industrial organization, accounting, and cultural subjects are emphasized.

The INSTITUTE can take a part in improving the education of chemists and chemical engineers by encourag-

ing more schools to adopt this type of program which should be the rule, not the exception. In connection with these programs, there is another job to be done. The traditional courses in these subjects should be altered. New concepts of teaching and new types of courses are needed so that the scientific or engineering student will understand the relation of these subjects to his specialized field.

The INSTITUTE should also take measures to encourage participation in school activities by chemistry and chemical engineering students. Course work in the sciences and engineering necessitates conscientious study and as a consequence, the student has a tendency to become a book-worm. That serious study is requisite cannot be denied, but a taste for participation in broader activities should be developed. Campus politics, sports, dramatics, journalism, and music provide opportunities to learn how to get along with other people.

Awaken Professional Consciousness

One of the greatest jobs for the INSTITUTE, however is the work to be done in awakening a sense of professional consciousness in both students and professors. If students graduate with the concept that they are on the market for employment with no more status than a trained technician, the whole profession suffers. Chemists who have such an attitude, in all probability, will never be any more than skilled artisans. Some other professions are far ahead in this matter of turning out graduates with a professional attitude. This task is more difficult in the chemical profession than in medicine, law, dentistry, etc., which have direct contact with the public. Their value to society is obvious while that of the chemist is more obscure. The chemical profession has another obstacle in its path in that it does not have legal status as do the above professions.

The INSTITUTE should formulate a concrete program wherein members speak on professional matters before chemistry classes and such groups as A.C.S. student affiliates, Sigma Xi, and Alpha Chi Sigma at colleges and universities. We cannot expect the professors to carry on such a program at present for some of them are no more aware of the need for professional consciousness than are the students. This duty falls squarely on the INSTITUTE. No other group is organized to carry out this task for the profession of chemistry.

The student has a right to know the demands that will be placed upon him as a professional man. He needs to know how to meet these demands so that he can maintain status as a professional man. The chemist must understand that his position requires dignity, honesty, and forthrightness. It is a pitiful sight, indeed, to see men with seven or eight years of col-

lege education become robots.

The failure to develop men of real professional stature will backfire into the progress of the science of chemistry itself. Vision is necessary for progress. If the profession is overburdened with undeveloped minds, it cannot help but include an increasing number of cook-book chemists. Important as the technician is, he is not comparable to real professionals. Such men ask only that some one direct specified duties to be performed before five o'clock in the afternoon, five days a week, and that wages be handed to them periodically. They are unlikely to contribute creative ideas.

Another danger to the profession is the development of too many chemists with an ivory tower outlook. Scientists and engineers are by nature perfectionists. While it is this trait that has improved our transportation, conquered many diseases and made other strides in modern civilization, perfectionism can, when carried to the extreme, be disillusioning to the individual as well as highly impractical. Students must learn that having a practical sense does not entail any sacrifice of intellectual honesty. Speakers from the INSTITUTE can do much toward giving chemists insight into the proper balance between perfectionism and practicality.

The program suggested herein for THE AMERICAN INSTITUTE OF CHEMISTS has great potential value in improving courses of study and in developing personalities. It is a duty of the INSTITUTE to put forth every effort toward the education of better chemists and better citizens.

Presentation

Dr. Johan Bjorksten

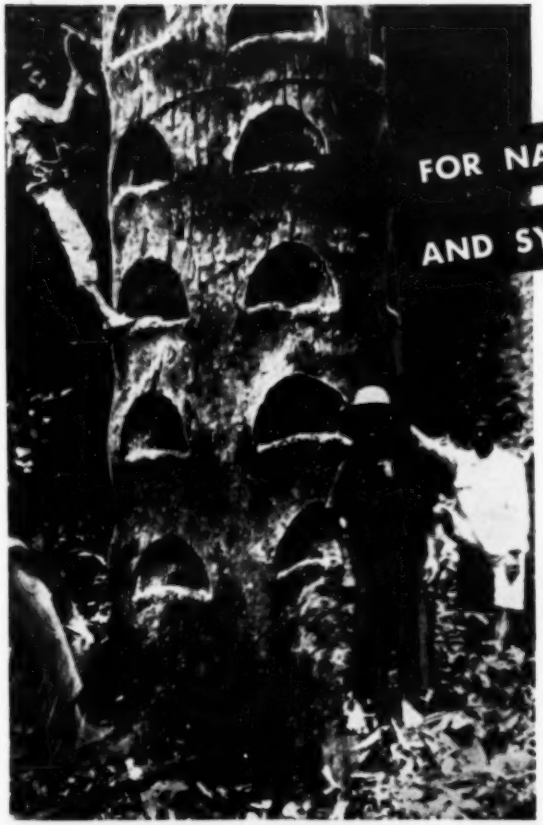
Former Chairman, Chicago Chapter, A.I.C.

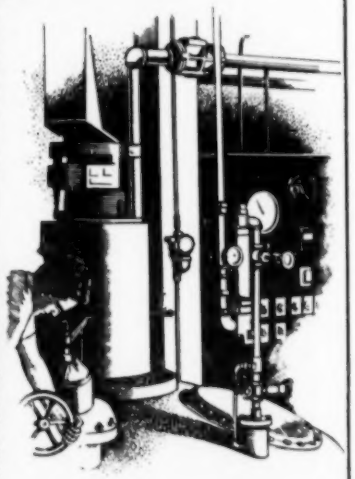
(Remarks made on the occasion of the award to Dr. Gustav Egloff of Honorary Life Membership in the A.I.C., June 3, 1949.)

IN ELECTING Dr. Egloff to the Honorary Life Membership of THE AMERICAN INSTITUTE OF CHEMISTS, the Institute was guided more by the great contribution Dr. Egloff has made to chemistry as a profession, than by his equally great achievements as a scientist and an inventor.

Dr. Egloff has done a very great deal for chemistry as a profession. He has represented us as chairman and delegate on innumerable scientific and civic missions of importance, here and abroad.

For those who have been privileged to work with Dr. Egloff, perhaps his most outstanding quality is





Collecting Gum Elemi in the Phillipines

Technical GLYCERINE NEWS

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★ ★ ★

BLACKBOARDS MADE FROM PAPER are now possible according to a patent published recently. Secret of the invention is an improved coating composition based on a glycerine ester of rosin. The coating, surface of black paper, is said to prepare the paper for the use of chalk. (R-12)

★ ★ ★

proved coating composition based on a glycerine ester of rosin. The coating, surface of black paper, is said to prepare the paper for the use of chalk. (R-12)

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SUPERIOR WATER-DISPERSIBLE COATINGS may result from the use of a new vehicle described in a recent patent. The vehicle, based on an alkyd resin (an important end-product of glycerine), is claimed to produce water-emulsifiable paints which are air-drying and possess improved hardness, water-resistance, and stability. (R-13)

★ ★ ★

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—*Chemical & Engineering News*

Dr. Egloff accepting Certificate of Honorary A.I.C. membership from Dr. Bjorksten.

his willingness to take risks, when by doing so, something of importance can be accomplished. Time and again, he has accepted assignments which few men of his prominence would have cared to touch. He has done so only for the sake of getting a task done which he deemed important for the advancement of our profession. In slashing through red tape and taking unorthodox action when such action was called for, he has many times rendered signal service to the profession.

Some time ago, I looked through an old chemistry book, which I had inherited from my grandfather. It was a large book of more than a thousand pages, which included the knowledge of chemistry broadly, as it existed about eighty years ago. Speaking of gasoline, this book con-

tained the following statement, "Gasoline is a fraction obtained from an oil, which comes from the ground in Pennsylvania, U.S.A. This product is useful for cleaning gloves. (Period)" In the large strides petroleum development has taken since those days, and which extends its ramification to all fields of chemistry, Dr. Egloff has contributed more than perhaps any other single man. His contributions of a personal nature although he has hundreds of patents issued to him, may be still exceeded by what he has done in gathering around him a group of men who collectively have contributed very greatly in the progress of this science. I have particularly in mind Dr. Egloff's action when he brought to this country Dr. Ipatieff, Dr. Komarewsky, pioneers in high pressure synthesis, and the many strong men he gathered around him, to mention a few: Dr. Charles L. Thomas, Dr. Herman Bloch, Dr. Louis Schmerling, Dr. Bernard Friedman, and the many others who have made their mark in petroleum chemistry as it exists today.

Still another activity of Dr. Egloff is exerting an increasing influence in the development of our science as a whole. The tremendous amount of information gained in petroleum and hydrocarbon chemistry can be applied in many other fields, but for such application, it is necessary that a concise, clear source of information exist. Dr. Egloff has provided this source by the books on the subject he has written, which concisely and clearly state the pertinent information, so that workers in other fields can benefit from the large store of information emanating from petroleum research.

Some time ago, I read a pamphlet which Dr. Egloff wrote more than twenty years ago about the future of cracking. It is seldom in retrospect that one sees a forecast precisely confirmed by actual development. It was amazing to note the accuracy with which Dr. Egloff prophesied the course and the paths taken by developments in hydrocarbons during the following twenty years. He saw then the role that diolefins would play in the synthesis of polymers and elastomers. He saw the development that was to come in our aromatization reactions, and even the spectacular developments of the acetylene chemistry were foretold by him then.

The chemical profession is indeed fortunate in having at its forefront a man with the prophetic ability and the willingness to serve the profession that Dr. Egloff has.

Dr. Egloff, I am honored to present to you this Certificate of Honorary Membership in THE AMERICAN INSTITUTE OF CHEMISTS.

Santoro Appointed Director

W. E. Santoro, F.A.I.C., associated with Standard Varnish Works, New York, since 1930, has been appointed director of laboratories of this firm.

The Employment Situation

Dr. W. J. Baeza, F.A.I.C., spoke to the Draper Society of New York University, May 12th, on conditions of employment in the chemical profession. After a sharp drop in placements in February, he stated, placements became more normal. The A. C.S. Regional Clearing House placements were but 3 per cent below average in April. But applications on hand of unemployed chemists and chemical engineers increased from the first of March to the first of May—17 per cent, and the applications of new graduates nearly 35 per cent in the same period. Since industry was convinced there would be a lack of trained personnel and urged colleges to train more scientists, Dr. Baeza stated, industry has a special obligation to absorb these young graduates promptly.

Food for the Mind

CARE's new program, "Food for the Mind," is designed to assist in repairing the war damage done to the libraries of Europe and Asia. In this it has the cooperation of the Library of Congress, the American Library Association, other groups, and the advice of UNESCO. UNESCO estimates that well over a thousand libraries have been partly or totally destroyed from Prague to Peiping. American voluntary contributions will be channelled by CARE in the form of textbooks on chemistry, medicine, mathematics, and other disciplines, to those colleges most in need. Contributions of funds may be sent to CARE, 20 Broad Street, New York 5, N.Y., or to any other CARE office in this country.

Elected Officers

L. C. Cartwright, F.A.I.C., was elected secretary, and Dr. Albert F. Guiteras, FA.I.C., treasurer, of Foster D. Snell, Inc., consulting firm, at the corporation's annual meeting held at its home office, 29 West 15th Street, New York, N.Y. Mr. Cartwright, born in Missouri, received the B.S. degree from the University of Florida, and the M.A. degree from Harvard University (1935). He continues as account executive for the firm. Dr. Guiteras, born in Cuba, received the B.S. degree from Lafayette College, and the Ph.D. degree from Goettingen University, Germany (1932). He will continue as director of bacteriology and toxicology for Foster D. Snell, Inc.

Potomac River Naval Command

The Board of U.S. Civil Service examiners for scientific and technical personnel of the Potomac River Naval Command announces an examination for Electronic Scientist, P-2 through P-8. Salaries, $3727.20 to $10,305.00 per year. Request announcement No. 4-34-4 (1949) issued June 24, 1949, from the Board at Building 37, Naval Research Laboratory, Washington 25, D.C.

How The Chemist is Chosen for Employment

John C. Holle

Director of Training, Interchemical Corporation, New York, N.Y.

(This is the fifth of a series of papers reviewed before publication by the Member Advisory Committee, New York Chapter, A.I.C.)

THE achievement of the objectives of any business organization is dependent upon the efficient selection and utilization of men, materials, and money. The paramount factor in this group is men, since the efficiency of use of materials and money is dependent to a great extent upon the caliber of the men to whom they are entrusted.

Many organizations expend great effort to insure proper handling of materials and money, overlooking the all-important factor of "human engineering." Much has been written since the last great war in an effort to point out this weakness and to suggest and outline corrective procedures. Two rather complete discussions by Richard L. Demmerle which complement each other were presented during 1947 in the *Chemical and Engineering News*. One entitled "Human Engineering" appeared in Vol. 25, page 14, January 6, 1947, and the other in Vol. 25, page 3562, December 1, 1947, under the title "Boxing the Compass of Chemical Personnel." Rather than repeat or enlarge on these, we will approach the subject from a different point of view, attempting to give a picture of the mechanics involved in the use of tests as an aid in the selection of laboratory personnel.

A clear definition of the objective is of primary importance. There are several goals we might shoot at, but we have found it to be sound business practice to follow the policy of selecting men with high future potential, rather than selecting men on the basis of immediate specific requirement. It is a sad state of affairs when an organization is suddenly faced with a choice administrative vacancy and finds there is no one within the organization qualified and trained to fill it. Yet this happens every day. Either of the two usual solutions to this problem is unsatisfactory; the filling of the position with an unqualified individual is an injustice both to the organization and to the man, and the filling of the position with an outsider, no matter how capable, leaves much to be desired in the way of maintenance of morale and smooth continuity of organization.

It is then apparent that there are

three considerations to our objective

(1) The immediate requirement for the laboratory;

(2) The potential requirement for the laboratory;

(3) The potential requirement for the organization.

Many executive, administrative, sales, service, and production positions are better filled by personnel with technical experience and training. The number of individuals to be trained for each job specification is a matter for statistical study. A close examination of the personnel records with respect to turnover, advancements, and creation of new jobs and departments will give a fairly sound basis for projection into future requirements. This must be tied in with the projected policy of the firm for the next few years, but generally speaking it will be found that most positions turn over on some sort of periodic cycle. There will always be exceptions but as long as we are aware that such will be the case we can prepare for that too. The specification for the man who fills a laboratory job today but is earmarked as potential for, say, a purchasing department or production vacancy five years hence requires a somewhat different approach, and this is where the psychologist and his testing program enter the picture.

Establish Qualifications

The first step in the development of the procedure is to establish the requirements of the job or combination of jobs and to translate these requirements into personal qualities. Analysis must be made to determine the duties and responsibilities of the composite requirement, and then a study must be made to determine the qualifications required to perform these duties and assume the responsibilities of the position.

The second step is to select the tests necessary to measure the qualifications of the individual being considered. Some tests are more accurate than others, and it is easier to test for some traits and for some jobs than for others. More reliance can be placed, for example, on intelligence test results than on personality test results. It is much easier to test for clerical positions than for supervisory positions. The principle to follow is to be sure the test is valid and reliable in measuring the traits or aptitudes for which it was designed. Now the question arises as to what the minimum acceptable score should be in each trait for the various job specifications. The procedure that is usually followed is to test all individuals who are now holding the positions in question. Arrange the tests in order based on past performance with the best man ranking number one. Then several supervisors who know all of the men and the quality of their work and have a good idea of their potential should analyze these lists together with test scores and chart a satisfactory minimum profile of desirable

traits and aptitudes for each job specification. As time goes on and more and more individuals come under the scope of the study, the profile can be corrected, revised, and kept up to date.

Tests Used

In the selection of laboratory personnel four types of tests are generally used: tests of intelligence, aptitude, interest, and personality. A battery which has been used with a good degree of success includes The Wonderlic Personnel Test, The Stanford Scientific Aptitude Test, The Kuder Preference Record, and The Personality Inventory by Bernrueter. For laboratory work the least important of these is the personality test. However, it is very important for the evaluation of potential for other positions. For example, a rather submissive introvert could be capable of performing excellent work at the bench but would have no potential at all for sales or management. On the other hand, a dominant extrovert could be capable of performing the same excellent quality of bench work and also have a high potential for sales or management.

A point worth mentioning is that personality tests because of their direct derivation from the findings of psychiatrists tend to reveal the extreme deviation and show their best usefulness in providing clues to dangerous or undesirable personality traits. Their primary value is evidenced by the fact that they are quite valid in segregating those who probably have no sales or administrative potential. In this connection it must always be borne in mind that tests provide an estimate in terms of probabilities, giving an indication of what an individual can do but most certainly not of what he will do. Also, it should be remembered that complete testing is always most reliable. The individual as a whole must be studied. For example, an individual with superior IQ and very high scientific aptitude as measured by, say, the Stanford test, could still turn out to be a very poor laboratory man because of extreme laziness, intolerance, irritability, indecision, etc., which might not be revealed except by tests designed to bring to light these specific traits. However, no individual will ever measure up to even near perfection in all traits and capabilities. He will have some good points, some weak points, and some down the middle.

Another question that arises is what the specific traits and aptitudes are, which significantly point toward the most desirable laboratory, sales, or administrative personality. A definite answer cannot be given because of the many exceptions that occur. A fairly accurate profile can be drawn for most job specifications, based on statistics, but we are never absolutely sure that the individual who does not meet the minimum pro-

file will not fit the job even better than some who do fit the pattern. For instance, the profile for a typical laboratory job would run something like this—above-average intelligence, introvert, low dominance, low self-confidence, high scientific interest, and high scientific aptitude. However, this does not mean that an extrovert with high dominance and self-confidence could not do the work as well and in some cases even better than the individual who exhibits the typical pattern.

We have tried to show that testing practices at best can give only an approximation and cannot be infallibly relied upon. However, when they are used as a guide in conjunction with the application and multiple interview they prove invaluable and are well worth the time, effort, and cost. This of course presumes that a qualified psychologist is in direct control of this phase of personnel work and, further, that management is behind the project and is fully supporting it.

Sussman Appointed Chief Chemist

Dr. Sidney Sussman, F.A.I.C., is now chief chemist of Water Service Laboratories, Inc., 423 West 126th Street, New York, N.Y., which specializes in corrosion prevention services in air conditioning systems, boilers, and water-piping systems. Dr. Sussman was formerly chief chemist for the Liquid Conditioning Corporation. His contribution to the development of the Seawater Desalting process won him a War Department Citation. After graduation from Massachusetts Institute of Technology in 1937, he served as research chemist at the Experimental Station of E. I. du Pont de Nemours and Company in Wilmington, Delaware.

Nickerson Receives Grant

Dr. Walter J. Nickerson, F.A.I.C., associate professor of Botany and Bacteriology, Wheaton College, Norton, Mass., received a grant of $4,428 from the American Cancer Society, for cancer research at Brown University. Last year Dr. Nickerson, on a Guggenheim fellowship, studied at Carlsberg Laboratorium in Copenhagen, Denmark, and at the Technical University in Delft, Holland. A native of Plainfield, N.J., Dr. Nickerson obtained the B.S. degree at West Chester College, Pennsylvania, and the Ph.D. degree from Harvard. He is editor of *The Biology of Pathogenic Fungi*, and author of many scientific papers.

Chemist Available

Inorganic Analytical Chemist, 28, M.S. equivalent, F.A.I.C. Seven years varied experience. Analyses of fluorine compounds, silicates, ferrous and nonferrous alloys, high temperature alloys, batteries, fuels and lubricants. Research on titanium and zirconium. Literature research. Publications. Familiarity with patents. Immediately available. Location immaterial. Please reply to Box 80, THE CHEMIST.

Annual Report 1948-1949

Committee on National Legislation Affecting Chemists

YOUR Committee on National Legislation Affecting Chemists presents its report on significant legislation, either proposed or enacted, which bears upon the economic status of chemists.

Five fields of legislation are discussed. The first concerns the status of the National Science Foundation. The second deals with legislation aimed at creating a Federal Clearing House for scientific and technical information. The third is the Water Pollution Control Act, which became public law No. 485, June 30, 1948. The fourth refers to Synthetic Fuel Bills. The fifth is concerned with Stockpiling, which at present is scheduled to continue until June 30, 1951.

(1) National Science Foundation

Bill S. 247, introduced by Senator Thomas of Utah for himself and five other Senators, passed the Senate March 18, 1949. Two bills, the same as S. 247, have been presented in the House; these are H.R. 1845 and 2308. Additional legislation is also pending in the House in the form of four identical bills, viz., H.R. 12, 185, 311, and 2751.

H.R. 359 is different from any of the other bills.

According to S. 247, "The Foundation shall have twenty-four members to be appointed by the President, by and with the advice and consent of the Senate." The President is "requested" to give "due consideration to any recommendation for nomination which may be submitted to him" by specifically named scientific organizations. This bill was drafted to meet the President's objection to the bill he vetoed which authorized the Foundation members to choose their own director. The present bill authorizes the President to appoint a director responsible only to him and with greatly increased powers. This is the most controversial feature of National Science Foundation bills. Neither S. 247, nor the House Bills specifically require the director to be a scientist, which opens the way for a politically dominated Foundation.

It may be noted that chemistry as such is not mentioned in these bills, except as it may be included in the term "Physical Sciences." Obviously, we still have not reached equal standing at least in the eyes of our legislators, with mathematics, medicine, biology, and the engineering sciences. The specific figures for salaries of administrators and services of consultants appear somewhat unrealistically low. More fundamental objections came out in the hearings conducted

in recent weeks. Although most of the experts testified strongly in favor of a National Science Foundation, a few of them warned against setting up government competition. One of them even saw the dirty hand of totalitarianism, which would extinguish indivdual freedom under centralized direction and ownership.

H.R. 359, different from the other pending House bills and in the pattern of one of last year's bills, names eight Divisions in the Foundation. One of them is to be devoted to Social Sciences which the other bills are careful not to mention. The provisions regarding patents are particularly complex in this bill.

The avowed purpose of the pending bills is to initiate and support basic scientific research, but the inclusion of the phrase "to appraise the impact of research upon industrial development and upon the general welfare;" leaves the way open for the Government to foster applied research. This trend is also indicated in the patent provisions of the bills since patents are not obtainable upon fundamental discoveries resulting from basic research, but only for the practical application of basic laws. There is no assurance that a Foundation would not engage in applied research. Borderline cases would probably be resolved in favor of the Government.

(2) Government Clearing House for Scientific Information

Bills for continuing the now defunct Office of Technical Services have been introduced. Following the lead of the Fulbright bill S. 493 of the 80th Congress, S. 868 by Johnson and H. R. 1711 by Crosser are now pending in the 81st Congress. These bills are identical, and are aimed ostensibly "to provide for the dissemination of technological, scientific and engineering information to American business and industry, and for other purposes." These bills are still before the Committee on Interstate and Foreign Commerce. If enacted, they would establish the U.S. Department of Commerce as a central Clearing House for technical information and registration of inventions and processes. The Department would also give advice and assistance to inventors. Legislation of this character would put the Government in direct competition with business and industry. The scope of the proposed activities for the Department of Commerce is so broad that it is impossible of accomplishment and it is also impossible for any small group of advisors to predict the future value of inventions.

(3) The Water Pollution Control Act

Public Law No. 485, referred to as the Water Pollution Control Act, was passed by the Eightieth Congress and approved June 30, 1948. Most

of the States have had laws protecting water courses for many years, but this is the first time a national program for elimination of water pollution has been established. There is provision for both technical and financial aid from Federal sources in working out a comprehensive coordinated water pollution control program.

The law still leaves the primary responsibility for control with the individual States. Federal control and legal enforcement provisions by Federal authorities are limited to instances in which pollution arising in one State endangers the health or welfare of persons in another State, and then only with the consent of the State in which the pollution is discharged.

Substantial financial assistance is authorized, although appropriations to implement this authorization have not been passed. The Public Health Service may make grants up to a total of a million dollars per year for studies related to industrial waste pollution and States and other public bodies may receive up to one million dollars a year for studies and preparation of plans through the Federal Works Agency. Loans to States and other public bodies may be made through the Federal Works Agency to a total amount of $22,500,000 per year for the construction of necessary treatment works.

A water pollution control advisory board composed of the Surgeon General, members of the Departments of the Army, Agriculture, Interior, and Federal Works Agency, and six members not government employees appointed by the President, has been established in the Public Health Service. The members who are not Federal employees are to represent various conservation interests and industry.

The Public Health Service has established a new Division of Water Pollution Control in Washington and is actively proceeding with the establishment of River Basin Offices in various geographic locations. A joint statement prepared by the Federal Security Agency, Public Health Service, and the Federal Works Agency's Bureau of Community Facilities sets forth specifically the proposed methods to be used in administering the Act.

As in many cases in our American history, where certain practices have been eliminated or forbidden by law, adequate consideration does not appear to have been given to the rights of individuals and communities who have used public water courses for many years as a means of waste disposal. The cost of cleaning up the streams should be borne by the country as a whole.

Many of the large manufacturing companies have already employed chemical or sanitary engineers to

study means for eliminating water pollution conditions.

(4) Synthetic Liquid Fuel Plants

There are now pending in Congress two identical bills, S. 6 and H.R. 566, aimed at maintaining an ample supply of liquid fuels and petroleum products through the memium of synthesis plants. The bills stipulate that the Reconstruction Finance Corporation will provide financial assistance for (1) the erection and operation of commercial-sized synthetic fuel plants (at least 5,000 bbls. per day) utilizing coal, oil shale and other substances, but not natural gas or petroleum; (2) research and development of improved processes of synthesis. Both the Department of the Interior and the RFC would have major responsibilities in effectuating the intent of the proposed act. The extent to which activities are projected may be realized from the provision that authorized loans may amount to $350,000,000 at any one time.

The bills also allow one-million dollars a year to finance the Secretary of the Interior in his activities.

(5) Stockpiling

The Strategic and Critical Materials Stockpiling Act (Public Law No. 520, 79th Congress, July 25, 1946) is administered primarily by the Munitions Board. The total cost is estimated at $3.7 billion, of which $1.5 billion have been authorized. The critical list comprises 68 items, among them certain metals, asbestos, chromite, diamonds, and rubber.

—L. N. Markwood, *Chairman*
A. M. Buswell.
Gustav Egloff.
Eduard Farber.

Necrology

Joseph Alexander Batscha, F.A.I.C., of Central Valley, New York, died March 27th. He was in charge of the Analytical Section of the Chemical Research Laboratory of Oakite Products, Inc., New York, N. Y. He leaves a wife and four children.

Mr. Batscha was born October 29th, 1903, in Cincinnati, Ohio. He received the Bachelor of Science degree from the University of Cincinnati in 1928 and took graduate work during 1929 at the same school in organic, physical, and dye chemistry.

He was associated with the United States Food, Dye, and Cosmetic Administration in New York, N. Y. from 1930 to 1943; the next two years he was employed by the Pyridium Corporation, pharmaceutical manufacturers at Harriman, N. Y. He joined Oakite Products, Inc., in 1945.

Mr. Batscha was a Fellow of THE AMERICAN INSTITUTE OF CHEMISTS and a member of the American Chemical Society.

—S. R. D.

COUNCIL

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Treasurer, Frederick A. Hessel

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Lincoln T. Work, *At-Large*

July Meeting

The 259th meeting of the National Council, A.I.C., was held July 13, 1949, at 6:00 p.m. at The Chemists' Club, New York, N.Y. President Lawrence H. Flett presided.

The following councilors and officers were present: L. H. Flett, K. M. Herstein, F. A. Hessel, R. P. Parker, W. T. Read, L. Van Doren, J. R. Withrow, and L. T. Work.

The minutes of the preceding meeting were approved.

The Secretary's report, showing a total membership of 2410, was accepted.

The Treasurer's report was accepted.

Upon motion, it was decided to hold the 1950 Annual Meeting in New York. President Flett was authorized to appoint the necessary committees to make the arrangements for the meeting.

It was brought to the attention of the Council that members who live outside Chapter areas sometimes feel remote from INSTITUTE activities. Upon motion, it was decided to allocate these non-chapter members to the nearest chapter to enable them to receive notices of meetings and information on activities in which they might participate through correspondence. The Treasurer was asked to make the allocation with the approval of the Executive Committee. Upon motion, it was decided to set the percentage of rebates on membership dues to the Chapters at 8 per cent instead of the present 10 per cent. The apparent reduction in rebates is expected to be more than covered by the rebates from the dues of the additional members (approximately 500) to be added to the Chapter Secretaries' lists of those who are to receive notices and other correspondence.

Upon motion, the Board of Directors was requested to consider the matter of extended membership.

A motion was presented to amend the By-Laws to add a new Article VI, entitled, "A.I.C. Award to Great Educators," to consist of Honorary Membership, a distinctive gold lapel button, and an illuminated scroll, "to stimulate greater respect for the profession of teaching chemistry and to advance the training of chemists," and setting up rules for the award. After discussion, it was moved that the By-Laws be so amended: it was then moved that this motion be tabled and amended to provide that the Committee on Honorary Membership, following the procedure suggested in the proposed amendment, offer, for late 1949, nominations of three to five Honorary Members who meet the requirements of great educators as set forth in the proposed rules, the Council then to act on these nominations. President Flett called for a recorded roll-call of the votes on the motion tabling the amendment to the By-Laws and passing the amendment thereto to award Honorary Membership to great educators. The vote follows: In favor: Hessel, Herstein, Parker, Read, Van Doren, and Work; Opposed, Withrow.

The following new Members were elected:

LIFE MEMBER

Hudson, Alfred Edward A.
Working for Ph.D. at North Carolina State College, Raleigh, N.C. Apt. 7, 4 Edgewood Apts., Goldsboro, North Carolina.

FELLOWS

Baizer, Manuel M.
Head, Research Department, N.Y. Quinine and Chemical Works, Inc., 99 N. 11th Street, Brooklyn, New York.

Bamberger, Curt
Research and Development Chemist, Patent Chemicals, Inc. 335 McLean Blvd., Paterson, New Jersey.

Kenyon, Richard Lee
Associate Editor, Industrial and Engineering Chemistry, and *Chemical and Engineering News,* American Chemical Society, 25 E. Jackson Blvd., Chicago 4, Ill.

Merscher, John Hoffman
Technical Service Engineer, S.C. Johnson & Son, Inc., Racine, Wis.

Paul, Philip T.
Chemist, Naugatuck Chemical, Nagatuck, Connecticut.

Schiessler, Robert Walter
Assistant Professor of Chemistry, Pennsylvania State College, State College, Pa.

Silverman, Herbert
Chemist, Materials Laboratory, N.Y. Naval Shipyard, Brooklyn, New York.

RAISED FROM

ASSOCIATE TO MEMBER

Sirota, Julius
Chemist - Consultant, Cathodium Metallizing Co., 40 Renwick St., New York.

RAISED FROM

MEMBER TO FELLOW

Hess, Paul S.
Research Chemist, Congoleum - Nairn, Inc., 195 Belgrove Dr., Kearny, New Jersey.

Thomas, Beaumont
Chief Chemist, Stebbins Mfg. Co., Watertown, New York.

There being no further business, adjournment was taken.

Local Chapter News

C. P. Neidig, F.A.I.C.

Niagara

The following outstanding students of chemistry in the Niagara area have been awarded Student Medals by the Niagara Chapter:

Hubert J. Keily,
Niagara University
Leon E. Wolinski,
University of Buffalo
Edward Zubler, *Canisius College*

Ohio

The one-hundredth annual commencement exercise of the Cincinnati College of Pharmacy (affiliated with the University of Cincinnati) were held on the evening of June tenth, in the Wilson Memorial Auditorium.

Among the numerous prizes awarded on this occasion was the one sponsored by the Ohio Chapter, A.I.C. to honor that graduate who had attained the consistently highest grades in chemistry throughout the four-year curriculum. This award is a unique distinction inasmuch as it is the first student medal granted by the Ohio Chapter. It was allocated to the Cincinnati College of Pharmacy by vir-

tue of the school's first century of education activities. The final choice of the student was left to the discretion of the faculty. The prize, an engraved bronze medal and a year's associate membership in the INSTITUTE, was presented to Giles Edward Blind, by Simon Mendelsohn, F.A.I.C., of the faculty, who is also a charter member of the A.I.C. and a district director of the Ohio Chapter. The medalist will specialize in certain phases of industrial pharmaceutical chemistry.

Washington

The final meeting of the season was held May 24th. Miss Elizabeth Hewston, F.A.I.C., U.S. Department of Agriculture, discussed the experimental work leading to the publication of "Vitamin and Mineral Content of Certain Foods as Affected by Home Preparation," which has appeared as U.S. Department of Agriculture Publication No. 628.

Mr. Teeter then spoke on "National Legislation Affecting Chemists," and discussed the National Science Foundation Bill. He gave a most interesting report of the Congressional hearings.

Student medals were presented to:
Earl R. Yowell,
George Washington University
Fritz Will,
The University of Virginia
Robert Michaels,
The Catholic University
Frank Hill,
The Catholic University
Jay B. Class,
The University of Maryland
Richard D. Hill,
Howard University
Dominic P. Mandracchia,
Georgetown University

The following new officers were elected:

Chairman, Dr. William T. Read
Vice Chairman,
Elizabeth M. Hewston
Secretary, Jeffrey R. Stewart
Treasurer,
Dr. Lawrence T. Fairhall

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For Your Library

The Genius of Industrial Research

By D. H. Killeffer, F.A.I.C. Reinhold Publishing Corporation. 270 *pp.* 6" *x* 9". $4.50.

Many books are important by reason of their content. Some few are important by reason of the excellence of their writing. The combination of both is rare even in the field of the world's literature. Dave Killeffer's *Genius of Industrial Research* is such a book. It would be tempting to review it by citing quotations from it. While a fair part of the text consists of portions of Perkin Medal and other honor award addresses, it is illuminated by the author's own flashes of verbiage that have the force of epigrams, such as this from the chapter, "Reports are Essential," "No wonder scientific training seems in all but the rarest exceptions to be totally incompatible with the use of the best English!"

It is now a platitude that research has become big business. This has brought forth a number of treatises on the nature and conduct of the industry. Most have embodied keen analytic thought and logical development. It has remained for Mr. Killeffer to point the moral by his quotations.

The analysis of industrial research which is furnished is indicated in the table of contents. The fifteen chapters include: "The Dual Nature of Research," "Thinking out the problem;" three chapters, respectively, "Process, Product and Equipment Research," and a chapter on "Evaluating Research." The concluding chapter, "Loose Ends Gathered Here," contains a number of references to general reading whose pertinence may seem remote, but which cogently illustrate the implicit point that a good researcher must have a mind furnished to live in many rooms. Each of these contains general discussion and then is illuminated by an extended quotation from one or another of the men who have been honored by our technical societies for their successful achievement of research objectives. Since these men have been selected by their fellows, from the considerable number who are engaged in such activity, for special distinction, it stands to reason that their words carry weight. It is by no means fortuitous that their words should also combine into a story both pleasant and interesting to read.

Starting with technical students in college and proceeding up through our entire body of research workers, the reviewer considers this book "must" reading which will be doubly rewarding. One reward is the clear

vision given by the book as a whole and the other is the pleasure which its reading will give to anyone who has the faintest interest in the field.

—Karl M. Herstein, F.A.I.C.

Surface Active Agents

By Anthony M. Schwartz and James W. Perry, F.A.I.C., Interscience Publishers, Inc. 1949. 6" x 9" $10.

The task of surveying the chemistry and technology of surface active agents is one of peculiar difficulty, as this reviewer is only too well aware. The patent literature, which has grown to overwhelming proportions during the last fifteen years, is almost the only source of original contributions to the field. The greater part of it is useless for the purposes of a monograph on the chemistry of surface active agents since the products described are of uncertain structure. Moreover, the industrial development of surface active compounds has far outstripped the scientific investigation of their properties. The literature affords few papers in which any attempt is made to correlate the chemical composition of these compounds with their behavior.

Those conversant with the literature of surface active agents can scarcely fail to agree that the authors have performed their task well and have produced a book which will stand as a landmark in the field for many years to come. The only review of comparable significance is the symposium held under the auspices of the British Section of the International Society of Leather Trades' Chemists, published, 1937, under the title, "Wetting and Detergency."

The authors have searched the literature so thoroughly that nothing of significance has been omitted. Their classification of surface active agents is logical and brings out the structural relationships of these compounds with clearness. They have treated the physical chemistry of surface active agents with skill and in enough detail to meet the needs of most readers. It would have been easy to fill several chapters with a survey of theoretical surface chemistry, much of which would have been of little interest and all of which is to be found elsewhere.

The chapters on the practical applications of surface active agents may prove to be the most useful part of the book to many readers. Accurate information on the industrial uses of surface active materials is quite difficult to collect since much of it is not published and the use claims made in patents are notoriously unreliable. These chapters constitute the best survey of this phase of the subject which has yet appeared.

This book seems to be quite free from errors. However, no matter how much care may be exercised, errors of some kind seem to creep into every book. The sentence at the top of page 418, stating that John Mercer discovered the process known as

mercerizing in the middle of the eighteenth century was evidently intended to read nineteenth century since Mercer was not born until 1791. There seems to be no reference to the work of Reychler, who as early as 1913 synthesized cetyl sodium sulphonate and tri-ethyl cetyl ammonium iodide, and who certainly deserves the credit for being the first to prepare synthetic surface active agents and to recognize their properties.

These are but minor blemishes in an otherwise scholarly and well-written book on a very timely subject. Schwartz and Perry's book should be welcomed by workers in widely divergent fields whose work brings them into contact with surface active agents.

—Dr. Donald Price, F.A.I.C.

Trade-Marks

By H. Bennett, F.A.I.C., Chemical Publishing Company, Inc., 1949. 479 *pp.* 5½" *x* 8½". $10.00.

This volume pertains to "legal and commercial aspects" of trademarks, "with particular attention to chemicals, chemical specialties and allied products, including a list of trademark and trade-name products and their suppliers." The legal aspects of the subject were checked before publication by A. J. Nydick, F.A.I.C. The book is divided into three parts: "Legal Aspects," "Coining of Trade-Marks," and "Trade-Mark Dictionaries." A pocket on the inside back cover contains three ingenious "name-finder" charts to assist in coining trade-marks. The attributes of the good trade-mark are discussed. Manufacturers, buyers, sellers, and chemists will find this book most useful, even if only for its alphabetic list of trade-mark chemicals, textile specialties, plastics, etc., which gives their chemical composition and manufacturers. Much of this information has not previously been published.

—V.F.K.

Synthetic Food Adjuncts

Synthetic Food Colors, Flavors, Essences, Sweetening Agents, Preservatives, Stabilizers, Vitamins, and Similar Food Adjuvants. By Morris B. Jacobs, Ph.D., F.A.I.C. D. Van Nostrand Company, x plus 335 *pp. Price* $5.50.

This little volume by a well-known authority on food products covers a considerable range of subjects with an amazing amount of detail. It is not "official," and neither prescribes nor prohibits means or procedures for coloring, flavoring or preserving food products. It is, however, descriptive, and leaves the means and uses subject to the regulations of the U. S. Food, Drug and Cosmetics Act, which are cited in appropriate places. The use of synthetic coloring matters is covered quite adequately and the certified colors are enumerated and described.

The description of synthetic flavoring agents of known combinations among them to simulate natural flavors occupies a large proportion of the text. Synthetic flavors as well as the solvents and fixatives for them are so diversified that they comprise a considerable part of descriptive, synthetic organic chemistry, and the subject has been well handled both from a didactic and a practical point of view.

Of even greater interest to the food industry and to the consumer alike is, perhaps, the subject of chemical preservatives and stabilizers. The prevention of mold on fresh fruits and vegetables and the preservation of canned goods and bakery products by harmless means are matters of common interest to producer and consumer. The last chapter is on vitamins with emphasis on their use as reinforcement to the usual vitamin contents of food products. An appendix gives many tables for the compounding of imitations of the natural fruit, nut and grain esters. On the whole, it is a satisfactory and practical manual.

—Dr. E. E. Butterfield, F.A.I.C.

CHEMICAL BOOKS ABROAD

Rudolph Seiden, F.A.I.C.

The following books were recently issued by European publishers:

(1) *A Direct Entry to Organic Chemistry*. By John Read. Published by Menthuen & Company, Ltd., London. 1948. 268 pp. with 20 illustrations. Price 4sh./6d. This is one of the "Home Study Books" edited by B. Ifor Evans, in which the author, professor of chemistry at the University of St. Andrews, attempts —and succeeds admirably—to outline a scientific picture of the nature and scope of organic chemistry without assuming any previous knowledge of this science on the part of the reader. Starting from first principles, Dr. Read proceeds to finally unravel the structural mysteries of most recent discoveries, e.g., vitamins, penicillin, Nylon, DDT, and sulfa drugs. This is one of the best refresher courses I can recommend to those who think they have forgotten their organic chemistry.

(2) *Unfaelle beim chemischen Arbeiten*. By Ernst Ruest and Alfred Ebert. Published by Rascher Verlag, Zurich. Second edition 1948. 403 pp. (Price not stated). Almost fifty years ago, Karl Egli wrote an article on accidents occurring when working with chemicals. More than twenty years later, Professor Ruest enlarged it, without changing Egli's practical classification of the material, and made it available in book form. For the second edition of this book, Dr. Ebert, editor of *Schweizer Chemiker-Zeitung*, compiled additional material. Even though the index contains over 2500 terms, we miss references to such poisonous or dangerous chem-

icals as acetanilid, aconite, chloraldehyde, etc. Nevertheless, this is a valuable compilation of facts—including indications of poisonings, chemical tests, first aid hints; addressed not only to teachers and their pupils, but also to factory managers, workers, physicians, and researchers. Approximately five hundred case reports taken from chemical, medical and accident-prevention magazines of Europe and America, are included to emphasize the warnings contained in the text. Among the chapters of this book are to be mentioned as particularly interesting those dealing with mechanical injuries, burns, caustics, poisons (alphabetically arranged) including war poisons, explosions and explosives, injuries due to radiation (infrared, ultraviolet, X-rays), etc. This book, or one of this type, should be in all laboratories and factories where people work with chemicals.

(3) Two books from Verlag Chemie, Winheim-Bergstrasse:

(*a*) *Mikro-Methoden zur Kennzeichnung organischer Stoffe und Stoffgemische.* By Ludwig and Adelheid Kofler. 205 pp. with 109 illustrations and many tables. Price DM 14. ($4.20) While determinations of melting points with the help of microscopes have been known for quite some time, the Koflers improved them so that they are now widely used not only for micro-chemical purposes, but also generally in place of macro-methods for the identification of organic substances and mixtures.

(*b*) *Grundriss der chemischen Technik.* By F. A. Henglein. Fifth edition. 1949. 636 pp. with 305 illustrations and 70 tables. Price DM 34. ($10.20). This "Outline of Chemical Technique" is an excellent work, addressed to advanced students of chemistry and engineering sciences as well as to practical engineers and non-chemists working for or interested in the world of ideas in which chemists and chemical engineers live and work. In the first part, "General Technology," the author describes in an excellent manner the chemical-technical reactions, working methods, equipment, laboratories and factories; the second part, "Special Technology," deals with the manufacture of metals, inorganic and organic chemicals, as well as with the production of many consumer's goods, such as foodstuffs, leather, soap, perfumes, rubber, plastics, paints, textiles, explosives, asphalt, ceramics, glass, etc.

This book, translated into English and somewhat modified to comply with American standards and conditions, should develop into an interesting enterprise for all concerned; and I believe that such a work would become one of the few chemical "best-sellers."

Condensates

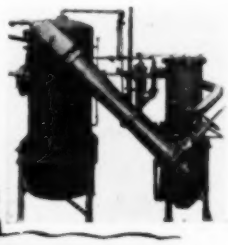
Ed. F. Degering, F.A.I.C.

Much of man's basic needs for food, clothing, and shelter—with which his economy has always been concerned—is directly or ultimately of plant origin. These natural resources are not quantitatively adequate to permit a continuing consumption at present world rates, with the result that men everywhere must face squarely the dual problems of the conservation of natural resources and the limitations of population or continue along the path, at an accelerating rate, toward self-destruction.

—Dr. Stanley Adain Cain,
Cranbrook Institute of Science.

The efficiency and adaptability of an industrial civilization is dependent on minerals as well as men; the search for minerals and the exploitation of rich deposits were vital factors in world power in the time of Alexander the Great, they are increasingly crucial today.

—Dr. Thomas Seward Lovering,



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